CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY
DEPARTMENT OF PESTICIDE REGULATION
MEDICAL TOXICOLOGY BRANCH

SUMMARY OF TOXICOLOGY DATA
Monosodium Isocyanurate*

Chemical Code # 1031, Tolerance # 50333

July 20, 1987
Revised 5/31/89, 9/27/93, 9/28/95 and 6/20/03

I. DATA GAP STATUS

Combined toxicity, rat:	No data gap, possible adverse effect.
Chronic toxicity, dog:	No data gap; possible adverse effect indicated [See discussion below]
Oncogenicity, mouse:	No data gap; no adverse effect.
Reproduction, rat:	No data gap; possible adverse effect (not repro)
Teratology, rat:	No data gap, no adverse effect
Teratology, rabbit: :	No data gap; possible adverse effect
Gene mutation:	No data gap; no adverse effect.
Chromosome effects:	No data gap; no adverse effect
DNA damage:	No data gap; no adverse effect
Neurotoxicity:	Not required at this time.

Toxicology one-liners are attached.
All record numbers through 204361 were examined.
** indicates an acceptable study.
Bold face indicates a possible adverse effect.
File name: T030620
Revised by Revised by: J. Gee, 5/89; P. Iyer, 9/27/93; 9/28/95 and Gee, 6/20/03
Revision of EPA 1-liners pertaining to the EPA Memorandum (1/5/89) was performed (12/29/89) by M. Silva.

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* The U.S. E.P.A. has designated monosodium cyanurate (50333, SB#350 as monosodium salt) as a representative test substance for the following: trichloro-s-triazinetrione (50240, SB#328); dichloro-s-triazinetrione (50451, SB#643); sodium dichloro-s-triazinetrione (50332, SB#344; dihydrate is 50337, SB#340); potassium dichloro-s-triazinetrione; and mono-(1,3,5-trichloro)-tetra(1-monopotassium-2,3- dichloro) penta-s-triazinetrione. (See also 50333-033 for EPA requirements). This summary is based on a review of relevant data submitted for the 5 substances indicated by SB #'s; Note that the major substance tested was monosodium cyanurate. Note: Toxicology one-liners are attached.

II. TOXICOLOGY ONE-LINERS

See "Guidance for the Reregistration of Pesticide Products Containing Chlorinated Isocyanurates as the Active Ingredient." EPA, dated May 20, 1988.
In water, chlorinated isocyanurates hydrolize to give cyanurate and hypochlorous acid. Cyanurate is a member of the symmetrical triazine family. Gee, 5/89.

See updated RED of September, 1992.

COMBINED CHRONIC/ONCO, RAT

**** 50333-034 041258 through 50333-047 041271** "Chronic toxicity and oncogenicity study in rats (s-triazinetriole, monosodium salt), volumes 1-14" (IRDC, #0167-157, 10/30/85). S-triazinetriole, monosodium salt (99.7%) at 0, 400, 1200, 2400, 5375 mg/l or a sodium control (as in 5375 mg/l) was available in drinking water ad libitum to CD rats (50/sex/group) for 24 months. There were interim sacrifices and 6, 12 and and 18 months, 10/sex/group. **Adverse effects** noted as tubular nephrosis, urinary blockage with associated hematuria, cystitis, and hydronephrosis, endomyocarditis with myocardial necrosis, and reduced lifespan in 5375 mg/l males; NOEL = 2400 mg/l of drinking water (154 mg/kg, males & 266 mg/kg, females). ACCEPTABLE. (Carlisle, 8/11/86)
EPA 1-liner: Acceptable with a NOEL of 2400 ppm (Reregistration standard of 1988).

50333-017 025322 through 019 0025324 (IRDC #167-157, 4/83) 12-month report of 41258. See review of final report.

50333-020 025326 (Robert G. Geil, Kalamazoo MI, IRDC #167-157,) Pathologist report on 12-month necropsy of 041258. See review of final report.

50240 - 131 204361 "An evaluation of the long-term toxicity-carcinogenicity of sodium isocyanurate." (Occidental Chemical Corporation, 2/25/99) Comments regarding an Expert Panel which was convened to reevaluate the effects seen in the report by Blair, IRDC, 1985, # 167-157, regarding the urinary bladder and calculi and hyperplasia in high dose males in the first 12 months of the study. No data. Conclusions regarding the relevance to humans and the appropriate endpoints to use for risk assessment were presented. (Gee, 6/18/03)

50240-045 005350 "Studies of the Toxicity of Sodium Dichlorocyanurate and of Monosodium Cyanurate." (Dept. of Pharmacology, U. of Rochester, 10/24/59, Hodge, et al.) Albino rats, 10/sex/group, were fed 0, 10 ppm (0.001%) CDB-60 (sodium dichloroisocyanurate as available chlorine), 200 ppm CDB-60, 0.8% monosodium cyanurate (CA), or 8.0% CA for 6 months; no affect on hematology, urinalysis; reduced body weight gain at 8% CA especially in males; reduced liver and kidney weights in males at 8% and kidney weights in females; pathology noted dilated collecting tubules in the ducts of Bellini in the kidney in 8% CA males; no changes in the thyroid; no findings in other treatment groups reported. Supplemental data. No worksheet. Gee, 5/5/89.

CHRONIC DOG

The EPA reregistration standard of 1988 for chronic toxicity in a non-rodent has a footnote that a study in the dog is not being required based on the comparative metabolism in the rat and dog. In addition, there is a publication in which five human subjects were studied and found to excrete essentially all of the ingested sodium cyanurate unchanged in 24 hours, agreeing well with the findings in two species of animals. In addition, the kidney was suggested as a target organ in the dog as well as in the rat the 1965 publication albeit at a very high dose and only after more than 16 months of dietary exposure. In view of the collective data available from metabolism, rat and mouse long term studies (including the rat reproduction study) and the early dog study, a new study in the dog is not scientifically required at this time. Repeating the study would likely only

identify the kidney as target organ with toxicity limited to high doses. In addition, the effect as seen in the rat required comparatively long-term exposure and a 1-year study in the dog - as currently required by guidelines - could possibly be negative due to an inadequate length of exposure. In addition, there are data from a 6-month exposure of dogs to 0.8% (8000 ppm) in the diet with negative results (see # 005341). This study does not meet guidelines but does provide useful information. See also **METABOLISM** below for data on three species (rat, dog and human). Gee, 5/89.

50240-043 034784 "Toxicity of sodium cyanurate" (Hodge et al., University of Rochester) publication in Toxicol. Appl. Pharmacol. 7: 667-674, 1965. Summary of a chronic study (3 dogs). **Adverse effects** noted as kidney fibrosis, focal thyroid atrophy with lymphocytic infiltration at the high dose of 8%. Doses of 0.8% of the diet were fed for 6 months and 8% up to 2 years. UNACCEPTABLE, but noted because of positive findings at 8% for over 1-year. (Apostolou, 7/30/85 and Gee, 5/10/89)
EPA 1-liner: Core Guideline, 1/5/89.

50240-045 005341 Duplicate of 034784 plus additional data on 3 dogs at 6 months on 0.8% cyanurate (005346). Dogs (3/group) also fed CDB-60 (sodium dichloroisocyanurate) at 10 or 200 ppm as chlorine with no reported effects at 6 month sacrifice in any group. No worksheet. Gee, 5/5/89.

ONCOGENICITY RAT

50240-046 005337 "Two-year carcinogenic study with monosodium cyanuric acid in albino rats". Unvalidated IBT study (621-03204, 8/75).

50337-008 006165 Review of 005337 by R. W. Fogleman.

50240-047 005980 "Two-year carcinogenic study with monosodium cyanurate in albino rats". Unvalidated IBT study (621-00753, 10/73).

50337-008 006162 "Two-year carcinogenic study with monosodium cyanurate in albino rats". Review of unvalidated IBT study (621-00753, 10/73) by R. W. Fogleman.

MOUSE

** 50333-049 041982 through 059 041992 "104 Week oncogenicity study in mice" (Hazleton, Vienna, VA, 2169-101, 2/7/86). Cyanuric acid, monosodium salt (77.5%) was administered to B6C3F1 mice (80-100/sex/group) in drinking water at concentrations of 100, 400, 1200 and 5375 ppm (maximum soluble level) with approximate average achieved doses of 24, 97, 307 and 1525 mg/kg/day. Water and sodium controls (equivalent to high dose) were used. No adverse effects noted. NOEL= 307 mg/kg/day (clinical signs and observations, including growth rate, water consumption, urine sodium). ACCEPTABLE. (Hathaway, 7/29/86 and 6/15/87)

50240-047 005977 "18-Month carcinogenic study with monosodium cyanurate in albino mice". Unvalidated IBT study (621-03205, 1/75).

50337-008 006164 Review of 5977 by R. W. Fogleman.

50337-008 006161 "18-Month carcinogenic study with monosodium cyanurate in albino mice". Review of unvalidated IBT study (621-00755, 10/73) by R. W. Fogleman.

50240-047 005984 "18-Month dermal carcinogenicity study with monosodium cyanuric acid and

HTH (calcium hypochlorite) in Swiss white mice". Unvalidated IBT study (651-00751, 4/74).

1054-004 and 005 954780 Same as of 5984.

50337-008 006163 Review of 5984 by R. W. Fogleman.

REPRODUCTION RAT

**** 50333-028 035471 through 031 035474** "Three generation reproduction study in rats with sodium salt of cyanuric acid (s-triazinetriol)"; IRDC; 497-001; 5/10/85. Monosodium cyanurate (77% cyanurate) was administered in drinking water to Charles River CD rats (12M, 24F/group/generation) at concentrations of 400, 1200 and 5375 ppm cyanurate over 3 generations. Water and sodium controls were used. **Adverse effects in parent males (urinary bladder calculi and lesions)**. Parental (chronic) effect NOEL = 1200 ppm; reproductive NOEL $\geq$ 5375 ppm. Reviewed previously as unacceptable (Remsen, 10/10/85: too few males mated/generation and no justification for highest dose). Upgraded now to ACCEPTABLE since solubility data provided (50333-062-- 3/30/87 letter) show that the highest dose was the maximum feasible concentration, and since the study data indicate that 2 litters/generation and 3 generations provided sufficient animals for evaluation. (Harnois, 7/15/87).

TERATOGENICITY RAT

50240-046 005335 "Pilot teratogenicity study with monosodium cyanurate plus chlorine in albino rats". Review of an unvalidated IBT study (B757) by R. W. Fogleman.

50337-007 006157; 50240-04600 005338 Same as 50240-046 5335

50240-047 005981-3 "Teratogenic study with monosodium cyanurate plus chlorine; mono-sodium cyanurate and calcium hypochlorite in albino rats" Unvalidated IBT study (B758 4/72).

1054-004 954783 and 005 954783 Same as 50240-047 5981-3.

50337-007 006158 00- 006160 Review of unvalidated IBT study (B758, 4/72) by R. W. Fogleman.

** 50333-060, -064 904947, 059646 "Teratology Study in the Rat with Monosodium Cyanurate." (IRDC, Mattawan, MI 167-159, 5/14/82). Monosodium cyanurate (99.7%) was suspended in 4% aqueous CMC and administered to COBS CD rats (25/group) by oral gavage at 0 (both no treatment and vehicle controls), 200, 1000, and 5000 mg/kg/day (20 ml/kg) on days 6-15 of gestation; sodium control approximated sodium in 1000 and 5000 mg/kg/day cyanurate. No adverse effects reported. NOEL > 5000 mg/kg/day (maternal and fetal development). Initially reviewed as Unacceptable (no analysis of dosing preparation) but upgradeable. (Harnois, 7/8/87) Record # 059646 in 50333-064 contains copies of lab notebooks describing the preparation of the

dosing solutions/suspensions daily. The study is upgraded to ACCEPTABLE status. (Gee, 4/28/89)
EPA 1-liner: Core Guideline, 1/5/89.

50333-060 051495 "Pilot study in the rat with monosodium cyanurate" (IRDC, Mattawan, MI 167-158, 10/81) Pilot study for 904947. Note that there was no analysis of test substance; NOEL reported as $\geq$5000 mg/kg/day (maternal and fetal development). (Reviewed with 904947.)

50333-005 904947 Same as 50333-060 904947

RABBIT

**** 068 127959, "**Addendum to Teratology Study in Rabbits with Monosodium Isocyanurate", (D.E. Rodwell, Springborn Laboratories, Inc., SLS Study No. 3222.1, 12/22/93). Monosodium isocyanurate, purity 99%, administered orally by gavage at concentrations of 0 (1.0% methylcellulose), 50, 200, or 500 mg/kg/day to 20 artificially inseminated New Zealand White female rabbits per group during days 6-18 of gestation. **Possible adverse effect: Increased hydrocephaly**. Developmental NOEL = 200 mg/kg/day (Numbers of viable fetuses were reduced; increased incidence of hydrocephaly). Maternal NOEL = 50 mg/kg/day (reduced body weight gain during latter part of exposure period). Initially reviewed as unacceptable. Upgraded upon submission of rationale for high dose selection. (Iyer, P., 9/27/95).

067 095824, "Teratology Study in Rabbits with Monosodium Isocyanurate", (D. E. Rodwell, Springborn Laboratories, Inc., SLS Study No. 3222.1, 12/4/90). Monosodium isocyanurate, purity 99%, administered orally by gavage at concentrations of 0 (1.0% methylcellulose), 50, 200, or 500 mg/kg/day to 20 artificially inseminated New Zealand White female rabbits/group during days 6-18 of gestation. **Possible adverse effect: Increased hydrocephaly**. Developmental NOEL = 200 mg/kg/day (Numbers of viable fetuses were reduced; increased incidence of hydrocephaly). Maternal NOEL = 50 mg/kg/day (reduced body weight gain during latter part of exposure period). However, all observed effects appear to be marginal, and perhaps can be resolved with a higher dose level. UNACCEPTABLE, possibly upgradeable. The rationale for high dose selection was not documented. (Kishiyama, J. and Iyer, P., 9/27/93).

50240-049 005287 "Monosodium cyanurate: teratogenicity study in the rabbit" (Consultox Labs., London, Eng. CL 73:101:899, 1/74). Monosodium cyanurate (102%) at 0, 50, 200 and 500 mg/kg in water was administered by gavage to pregnant Dutch Belted rabbits (9-12/group) on Days 6-18 of gestation, and the females necropsied on Day 28. Additional (9 and 10 respectively) pregnant females received 0 and 500 mg/kg and were allowed to deliver naturally. No significant test substance-related adverse effects reported. Initially reviewed as unacceptable (Apostolou, 8/1/85) because of lack of purity data, no justification for dose level, no statistical analysis, too few pregnant females. Data provided on purity and solubility (50333-062). Second review (Harnois, Parker; 7/14/87) found study UNACCEPTABLE and not upgradeable because of skeletal exam method, inadequate number of fetuses, no individual data on fetuses, pups or dam weights. There was insufficient information for Assessment of adverse effects.
EPA 1-liner: Core Minimum, 1/5/89.

50337-007 006156 Same as 50240-049 005287.

GENE MUTATION

BACTERIA

** 50240-049 005278 "Salmonella mutagenicity assay of CP 4789, DA-80-020" (Monsanto, DA-80-020, 5/27/80). 1). Spot test. Monosodium cyanurate (80-1-14-220, 77% cyanurate) in water at a concentration of 25 mg/spot used with and without activation (both rat and mouse liver enzymes) in TA98, TA100, TA1535, and TA1537 as a pilot test. Slight toxicity in TA1537, but no adverse effect (increase in revertants) reported. 2). Plate test. Monosodium cyanurate in water at concentrations of 0, 0.01, 0.04, 0.2, 1, 3 and 10 mg/plate with and without rat liver enzyme

activation in the four strains. There was no adverse effect. Study initially reviewed as technically acceptable and as unacceptable because of absence of purity data and of repeat trial. (Also reviewed as 6134. Apostolou, 8/1/85; 8/14/85). Purity data supplied (50333-06002). Rereviewed as unacceptable (only 1 trial). (Harnois, 7/6/87) The study is upgraded to ACCEPTABLE status based on the change in the guideline, in May, 1987, Federal Register. (Gee, 4/89)
EPA 1-liner: Acceptable, 1/5/89.

50337-005 006134; 50333-025 025337 Same as 50240-049 5278

50240-049 005282 "Variation in mutagenicity of s-triazole compounds tested on 4 Salmonella strains." Published data. (Lusby et al., U. Florida, Gainesville, Env. Mut., 1979, pp. 287-290) Summary of tests on 17 s-triazine compounds. No adverse effect (increase in revertants) reported, but the study was UNACCEPTABLE due to insufficient information for assessment. (Apostolou, 8/2/85; 1-liner by Harnois, 7/6/87)

50337-005 006131; 50240-043 005380. Same as 50240-049 5282.

MAMMALIAN CELLS

50333-061 005477 "Evaluation of test article cyanuric acid (sodium salt) for mutagenic potential employing the L5178Y TK+/- mutagenesis assay" (EG&G Mason Research Institute, Rockville, MD., 013-312-582-7, 5/21/81). Cyanuric acid, sodium salt (77% cyanurate) added to 1 tube-culture/concentration, 4 hrs at 37° C, with and without S9 at doses ranging between 110-2000 ug/ml. No adverse effect (increase in revertants) reported but slight toxicity without S9 at 1500 ug/ml. UNACCEPTABLE (only 1 trial). (Harnois, 3/26/87)

50333-025 025336; 50333-026 025338 Protocol for 5477

50333-026 025339; 50333-012 005477 Same as 50333-61 5477

CHROMOSOMES

50240-047 005978 "Mutagenicity study with monosodium cyanurate and calcium hypochlorite in albino mice" Unvalidated IBT study (E756, 4/72).

1054-004 and 005 954787 Same as 50240-047 5978.

50337-005 006132 Review of 5978 by R. W. Fogleman.

** 50333-061, -065 051520, 066535 "Evaluation of the mutagenic potential of sodium cyanurate using the in vivo rat bone marrow cytogenetics assay" (SRI, LSC2923, 12/81). Monosodium cyanurate (99.6%) was added to 50° C aqueous 4% CMC. Doses given by oral gavage to male Sprague Dawley rats (10/group) at levels of 0, 1.25, 2.5, 5.0 g/kg (20 ml/kg). Controls given 4% CMC; positive control given TEM ip. Colchicine given ip 2 hrs before sacrifice; 5 sacrificed at 24, 5 at 48 hrs; femoral marrow used, mitotic index recorded and 50 cells per animal scored. No adverse effect (increase in structural aberrations) reported. Initially reviewed as Unacceptable since used insufficient number of animals, use of only 1 sex not justified, no indication of substance stability under test conditions. (Harnois, 3/25/87) Submission of 066535 addressed the number, single sex and stability issues upgrading the study to Acceptable status. (Gee, 4/89)
EPA 1-liner: Acceptable, 1/5/89.
50333-014 and -023 025331 Same as 50333-061 51520.

DNA OR OTHER

** 50333-061 904951 "Evaluation of effect of monosodium cyanurate on SCE frequencies in cultured Chinese hamster ovary cells." (SRI, Menlo Park, CA. LSC-2923, 11/81). Monosodium cyanurate (99.6%) was prepared in medium with BUDR and added to cell cultures of CHO-K1 (ATCC CCL 61) at a final concentration of 94 - 1500 ug/ml. It was tested with (Aroclor-induced rat liver) and without activation in 3 trials; in 2, failure of positive controls prevents evaluation, and the 3rd had unidentified crystalline precipitate in all tubes containing BUDR and test substance. The precipitate was not related to test substance concentration. Initially evaluated as a "no test" with Insufficient information for assessment of adverse effect and as unacceptable. (Harnois, 3/25/87) Record 066535 in 50333-065 contains a rebuttal letter from SRI and copies of laboratory notebooks for the preparation of treatment media, state of cultures and other information upgrading the study to ACCEPTABLE status. (Gee, 4/28/89)
EPA 1-liner: 1/5/89.

50333-025 025335 Protocol for 061 904951

50333-006 904951 Same as 061 904951

NEUROTOXICITY

Not required at this time.

MISCELLANEOUS

50333-063 "Review of Toxicology Studies on Cyanurate and its Chlorinated Derivatives." (Publ. in *Environ. Health Perspectives* 69: 287-292 (1986), Hammond, B. et al.) Review of published and unpublished information submitted to EPA under FIFRA. The review cites a study in mice [Yakubutsu Ryoho 13: 22-33, 1980, Tani, I. et al.] with dichloroisocyanurate at 0, 25, 100 or 400 mg/kg/day, days 6 - 15, by gavage with no developmental toxicity except delayed ossification at the high dose, which was also maternally toxic. Other SB950-required studies cited are on file at CDFA. No worksheet. Gee, 5/5/89.

METABOLISM

Note: These studies have been reviewed as they are the basis for EPA not requiring a chronic feeding study in the dog, as footnoted in the Reregistration document of May, 1988 and as discussed in the rebuttal response of Monsanto dated May 27, 1987 in 50333-065.

50333-063 "Absorption and Excretion of Cyanuric Acid in Long-Distance Swimmers." (Publ. in *Drug Metabolism Reviews* 13 (3): 499-516, (1982), Allen et al.) Five relatively young (teenage or less) volunteers were studied for excretion of cyanuric acid in urine following soaking in a treated pool for two hours or by drinking solution of known concentration (not stated in the report). Quantitation was by HPLC and identification by mass spec. The half-life was found to be about 3 hours and recovery was 98% in 24 hours after oral ingestion as cyanuric acid. The study does not address the risk of kidney affects. Also measured was q-glutamyl transpeptidase, an enzyme which occurs on the external surface of the brush border of the kidney. The authors thought there might be a correlation between cyanurate excretion and enzyme in the urine but none was found. Supplementary data. No worksheet. Gee, 5/5/89.

50333-063 057932 "Disposition and Metabolism of ^{14}C-Labeled Sodium Cyanurate in the Dog."

(Arthur D. Little, Inc., MA, 8/31/82) Sodium cyanurate monohydrate, 99.5% pure and U-^{14}C-labeled sodium cyanurate monohydrate, sp. act. 9.8 mCi/mmol (>99% radiochemically pure by HPLC) were used. Dosing solutions/suspensions were prepared daily and analyzed for content. Beagle dogs were used. Food was withheld 14 hours before and 4 hours after dosing. Doses were 5 mg/kg i.v., 5 mg/kg p.o. or 500 mg/kg in suspension by gavage, 4/sex/group. Two/sex were used for serial blood collection and 2 for urine, feces and tissue collection. An additional 1- 2/sex were given 5 mg/kg unlabeled sodium cyanurate by gavage for 14 days and labeled compound on the 15th and 1 female was given 4.45 mg/kg. Blood was collected at 5, 15, 30 min., 1, 2, 4, 6, 8, 12, 16, 24, 48, 72 hours and 7 days. Urine was collected at 0-6, 6-12, 12-24, 24-48, and 48-75 hours or longer. Cyanurate in urine was identified by HPLC. Sensitivities for detection were 0.1 mg/g for 5 mg/kg and 3.3 mg/g for 500 mg/kg - dpm administered adjusted by mixing labeled and unlabeled compound. After 5 mg/kg i.v. or p.o., the half-time for elimination was 1.5 to 2 hours and peak blood concentrations at 30 min (3 dogs) or 2 hours (1 dog). After 500 mg/kg, the kinetics were more complicated, possibly due to continued absorption. Most of the excretion was via the urine after 5 mg/kg. Measurable amounts were excreted in the feces after 500 mg/kg. Males and females were similar. No detectable radioactivity was recovered from any of the tissues sampled including kidney, urinary bladder, thyroid. Chromatography indicated the sodium cyanurate was excreted unchanged. The recovery of radioactivity ranged from 81 to 101% with a mean of 91%. Supplemental data. No worksheet. Gee, 5/10/89.

50333-063 057933 "Disposition and Metabolism of ^{14}C-labeled Sodium Cyanurate in Rat." (Arthur D. Little, MA, 6/17/83) Sodium cyanurate monohydrate, 99.5% pure, lot no. 1219649-3, and (U)-^{14}C-labeled sodium cyanurate monohydrate (NEN lot no 1166-069), >99% radiochemically pure by HPLC; dosing formulations prepared daily and analyzed by HPLC; Sprague-Dawley rats, 8-10 weeks of age; sodium cyanurate given to 17/sex at 5 mg/kg i.v. and p.o. in solution, at 500 mg/kg in suspension by gavage to 17 males and 15 females; 5 from each group were used for serial blood collection, 5 for blood collection at peak concentration and 5 for urine, feces and tissue and 2 for CO_2 collection. In addition, unlabeled sodium cyanurate was given at 5 mg/kg p.o. to 7/sex for 14 days and labeled compound on the 15th day - 5 for urine, feces and tissues and 2 for CO_2. Blood was collected at 5, 15, 30 min., 1, 2, 4, 6, 8, 12, 16, 24, 36, 48, 72 hours and 7 days. Urine and feces collected from 5/sex at intervals of 0-6, 6-12, 12-24hrs, and daily to day 7. Unlike the dog study, the rats were not starved before dosing so that all groups (single dose and multiple dose) would be treated alike. Peak blood concentrations were seen at 15-30 min after 5 mg/kg p.o. and at 60 min after 500 mg/kg. Excretion was primarily in the urine after the low dose by either route; a greater proportion was in the feces after 500 mg/kg. No significant levels were found in any tissue sampled. As with the dog, 98% of the radioactivity recovered had the same retention time as sodium cyanurate. Supplementary data. No worksheet. Gee, 5/10/89.

Summary: Although there were some differences reported between rats and dogs, they eliminated sodium cyanurate in similar time courses and essentially unchanged. Gee, 5/10/89.